The invention claimed by Applicants is a digital communications system having a transmitter for transmitting information in the form of a phase shift keyed signal, *which phase shift keyed signal is divided into a plurality of windows*, each of which is offset in time, and a receiver for receiving said information. The system further comprises a demodulator comprising conversion means for converting the phase shift keyed signal, that is the plurality of windows comprising the phase shift keyed signal, into a plurality of successive outputs. Each of the successive outputs is representative of a phase and amplitude of the phase shift keyed signal over *additional sets of windows* and carrier phases, where each additional set has different offsets in time and carrier phase from the other additional sets. The demodulator further comprises estimation means for using the plurality of signals to estimate the carrier phase and the window offsets of the phase shift keyed signal, which carrier phase and window offsets are synchronous, and decoding means for decoding the phase shift keyed signal back into digital data using the obtained estimates. The essence of this invention is that one can calculate a set of possible data streams, one for each of several possible transmitter time bases, and then pick the best one according to criteria of signal strength and data integrity. For the reasons set forth herein below, Applicants respectfully urge that the prior art relied upon by the

Examiner as the basis for rejection of the subject application neither teaches nor suggests the invention claimed by Applicants.

Claims 1-3 have been rejected under 35 U.S.C. 102(b) as being anticipated by Petranovich, U.S. Patent 5,625,652 (hereinafter "the Petranovich patent"). This rejection is respectfully traversed. The Petranovich patent teaches a digital demodulator comprising a phase detector which accepts an input of digital data formed by sampling a received analog phase shift keyed signal and converts the digital data into phase estimates based on transitions in the digital data. The phase estimates are then converted to phase data indicative of the transmitted information by a data decoder. In particular, the digital data, which constitutes a portion of an analog phase shift keyed signal, is grouped into overlapping windows of data as shown in Fig. 9. The digital demodulator comprises a unique word detector, a timing recovery controller, and a frequency controller. The decoded data is output to the unique word detector, which correlates the decoded data with a predefined unique word. When the unique word has been detected, the unique word detector outputs a signal indicating within which of the overlapping windows the unique word had been detected. The frequency controller monitors the phase estimates provided by the data decoder and compares them with the closest of the possible transmit phases to determine a phase error, which is indicative of a drift in frequency. The frequency

controller then determines a frequency offset from time to time to track the frequency of the received phase shift keyed signal. The timing recovery controller uses the frequency offset to adjust the phase error determined after each symbol period (Col. 4, lines 22-51).

Applicants respectfully urge that there is no teaching or suggestion by the Petranovich patent of *dividing the phase shift keyed signal into a plurality of windows*, each of which is offset in time, and *then converting the phase shift keyed signal into a plurality of successive outputs, each of which is representative of a phase and amplitude of the phase shift keyed signal over additional sets of windows and carrier phases*, each additional set of which has a different offset in time and carrier phase from the other additional sets. Although the Petranovich patent does teach grouping the analog phase shift keyed signal into a plurality of overlapping windows, which the Examiner indicates corresponds to the division of the phase shift keyed signal into a plurality of windows as claimed by Applicants, *nowhere does the Petranovich patent teach or suggest the establishment of additional sets of windows* (and carrier phases), each additional set of which has different offsets in time and carrier phase from other such additional sets of windows and carrier phases. That is, only a single set of windows (Fig. 9) is taught or suggested by the Petranovich patent. Accordingly, absent any elements relating to the conversion of a phase shift keyed

signal, which has already been divided into a plurality of windows offset in time, into a plurality of of successive outputs where each successive output is representative of a phase and amplitude of the phase shift keyed signal over *additional sets of windows* and carrier phases, Applicants respectfully urge that the demodulator of the Petranovich patent does not function in the manner of the invention claimed by Applicants and, thus, the Petranovich patent does not anticipate the invention claimed by Applicants in the manner required by 35 U.S.C. 102(b).

Claim 4 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the Petranovich patent as applied to Claims 1-3, and further in view of Matsumoto, U.S. Patent 4,763,331 (hereinafter "the Matsumoto patent"). This rejection is respectfully traversed. Applicants' arguments with respect to the Petranovich patent are equally applicable to this rejection and, thus, will not be repeated other than to reiterate that the Petranovich patent neither teaches nor suggests the conversion of a phase shift keyed signal, which has already been divided into a plurality of windows offset in time, into a plurality of of successive outputs where each successive output is representative of a phase and amplitude of the phase shift keyed signal over *additional sets of windows* and carrier phases as claimed by Applicants. The Matsumoto patent teaches a soft decision decoding method which decodes a code having redundant bits added to the information data bits and

transmitted as an error correcting code and in which the received code is decoded bit by bit to produce a received word and reliability information for respective digits at which the received word and each of candidate code words disagree with each other is summed up (Abstract). The Matsumoto patent is relied upon by the Examiner as teaching the use of maximum increasing function of absolute value for window offset estimation, based upon which the Examiner argues that it would have been obvious to one of ordinary skill in the art to employ such function in the demodulator of the Petranovich patent to arrive at the invention claimed by Applicants. Applicants respectfully urge, however, that because the Petranovich patent *does not* teach all of the elements of the invention claimed by Applicants as discussed herein above, application of the teachings of the Matsumoto patent to the demodulator of the Petranovich patent would not result in the invention claimed by Applicants. Accordingly, Applicants respectfully urge that the Petranovich patent and the Matsumoto patent, alone or in combination, do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. 103(a).

Claims 5 and 8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Petranovich patent as applied to Claims 1-3 as discussed herein above in view of Eastmond et al., U.S. Patent 6,088,337 (hereinafter "the Eastmond et al. patent"). This rejection is respectfully traversed. Applicants' arguments with

respect to the Petranovich patent are equally applicable to this rejection and, thus, will not be repeated. The Eastmond et al. patent teaches a time division duplex wireless communication system and a method for controlling a space diversity switch in a time division duplex system. The Eastmond et al. patent is relied upon by the Examiner as teaching "a function of the sum of the squares of the out-of-phase autocorrelation, are commonly used to determine good synchronization words." Regarding the claim of comparing the sum of squares to a theoretical value as claimed by Applicants (Claim 8), the Examiner argues that the Petranovich patent discloses comparison of a phase error to a *predetermined threshold*. Accordingly, the Examiner argues that it would have been obvious to one of ordinary skill in the art to apply the teachings of the Eastmond et al. patent to the invention of the Petranovich patent to arrive at the invention claimed by Applicants. Applicants respectfully disagree. As previously stated, the Petranovich patent *does not* teach all of the elements of the invention claimed by Applicants as discussed herein above and, thus, Applicants respectfully urge that application of the teachings of the Eastmond et al. patent to the demodulator of the Petranovich patent would not result in the invention claimed by Applicants. In addition, Applicants further disagree with the Examiner's assertion that comparison of the sum of squares to a theoretical value as claimed by Applicants corresponds to comparison of a phase error to a predetermined value as taught by the Petranovich

patent. In particular, Applicants respectfully urge that while there is *only one theoretical value* for a given set of conditions, there are *multiple possible predetermined thresholds*, which predetermined thresholds may not, in fact, correspond to any theoretical value as claimed by Applicants. Accordingly, Applicants respectfully urge that the Petranovich patent does not teach or suggest the use of theoretical values as claimed by Applicants. Thus, given the fact that the Petranovich patent does not teach all of the elements of Claims 1, 2 and 3 of the invention claimed by Applicants, Applicants respectfully urge that application of the teachings of the Eastmond et al. patent to the demodulator of the Petranovich patent would not result in the invention claimed by Applicants. Accordingly, Applicants respectfully urge that the Petranovich patent and the Eastmond et al. patent, alone or in combination, do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. 103(a).

Claim 6 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the Petranovich patent in view of Kumar, U.S. Patent 5,966,401 (hereinafter "the Kumar patent"). This rejection is respectfully traversed. Applicants' arguments with respect to the Petranovich patent are equally applicable to this rejection and, thus, will not be repeated other than to reiterate again that the Petranovich patent neither teaches nor suggests the conversion of a phase shift keyed signal, which has already been

divided into a plurality of windows offset in time, into a plurality of successive outputs where each successive output is representative of a phase and amplitude of the phase shift keyed signal over *additional sets of windows* and carrier phases as claimed by Applicants. The Kumar patent teaches a method and system for the reception of a biorthogonally-modulated RF signal in a simplex free-space system which is said to diminish the coupling between the error probabilities of those bits associated with signal selection and those bits associated with signal polarity in prior art biorthogonal receivers. The Kumar patent is relied upon by the Examiner as teaching a receiver where "the correlations 31 and 33 are propagated to the absolute-value functions 35 and 37, respectively, which remove the polarity information from the correlation sums by discarding sign-bit information." Thus, the Examiner argues that it would have been obvious to one of ordinary skill in the art to use a maximum sum of absolute values for measuring and comparing the results of window offset estimations to the phase shift keyed signal detector of the Petranovich patent to arrive at the invention claimed by Applicants. Applicants respectfully urge, however, that because the Petranovich patent *does not* teach all of the elements of the invention claimed by Applicants as discussed herein above, application of the teachings of the Kumar patent to the phase shift keyed signal detector of the Petranovich patent would not result in the invention claimed by Applicants. Accordingly, Applicants

respectfully urge that the Petranovich patent and the Kumar patent, alone or in combination, do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. 103(a).

Claim 7 has been rejected under 35 U.S.C. 103(a) as being unpatentable over the Petranovich patent in view of Shenoy et al., U.S. Patent 5,297,172 (hereinafter "the Shenoy et al. patent"). This rejection is respectfully traversed. Applicants' arguments with respect to the Petranovich patent are equally applicable to this rejection and, thus, will not be repeated. The Shenoy et al. patent teaches a method and apparatus for acquiring the correct sampling timing for burst mode digital data transmissions, which use, as a backdrop, a PLL type conventional system, but which involves major changes thereto which allow for a reduced preamble length and a reduced level of circuit complexity. The Shenoy et al. patent is relied upon by the Examiner as teaching the requirement of a receiver to sample a received waveform once per symbol in a relatively small interval in order to minimize the bit-error-rate (BER), based upon which the Examiner argues that it would have been obvious to one of ordinary skill in the art to apply minimization of BER for measuring and comparing the results of window offset estimations to the detector of the Petranovich patent to arrive at the invention claimed by Applicants. Applicants respectfully disagree. As previously indicated and contrary to the assertions of the Examiner, the Petranovich